DETERMINATION OF THE FREQUENCY OF PHENOTYPIC EXPRESSION OF THE COAT IN HORSES OF THE MANGALARGA MARCHADOR AND QUARTER HORSE BREED

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ABSTRACT

Modern horse farming is the horse agribusiness complex, whose interest for sport, leisure and work is growing. In this sense, the demand for animals of certain coats aims at the associated service between performance and morphology in the same individual and its descendants. The objective of this study was to determine the FEFP (frequency of phenotypic expression of the coat) and its particularities in QM (Quarter Horse) and MM (Mangalarga Marchador) horses. To this end, the study was developed, through remote work, between August 1, 2020 and July 31, 2021, through retrospective research, through free access to a research website and the associations of the breeds, In analysis of 1,029 individuals of the QM breed and 982 of the MM breed, randomly selected, of both sexes, lineages, their respective fathers, grandfathers and grandmothers, paternal and maternal, calculation that aims at the FEFP registration and particularities of the coats. The means of the QM breed will be compared using the Scheffé test, all at the 5% level of significance. On the other hand, the MM breed was observed to have 19.82% sorrel animals, 5.15% bay, 27.11% brown, 1.36% lobuno, 19.24% pampa, 8.16% black, 2.62% rosilho and 11.95% tordillo. Under experimental conditions, when comparing male and female animals with different blood grades: own siblings, paternal siblings, maternal siblings and non-siblings, it is considered that the QM and MM breeds have a casuistry of occurrence of similar coats between sexes and different blood grades similar to the other known equine breeds.

Keywords: Equine culture. Quarter Horse. Phenotypic frequency. Coat.

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INTRODUCTION

Livestock activity based on the breeding of equine species is responsible for significant zootechnical and financial growth, in percentage terms, directly impacting Brazilian agribusiness, consequently, favoring the growth of the national GDP and constituting the so-called Horse Agribusiness Complex (LIMA; SHIROTA; BARROS, 2006; ANUALPEC, 2017).

A business based on about eight million head, the third largest herd in the world, spread across all Brazilian regions, covering all sectors of the economy, consisting of breeds originating in Brazil and the world, which, employed in various purposes and functions, and driving more and more research, the specialization of professionals, products and companies related to the area (ANUALPEC, 2017; MAPA, 2016). The state of Goiás is the fifth largest in number of animals and, with regard to animal breeds, those that have shown great growth in the number of registered animals, associated breeders and commercialization of animals are the Mangalarga Marchador, Quarter Horse and Crioulo, related to the strategies implemented by the associations and the lifestyle habit of the general society (ANUALPEC, 2017; IBGE, 2018).

In this sense, popularly known as horse color, the coat is an expression or phenotype, resulting from the animal's genotype. Among the external characteristics of animals, it is found between an attribute and a characteristic desired by equine breeders and appreciators, becoming a commercial aspect of the horse industry. There are several coats and particularities that an animal can present, resulting from the set of pigmentation, depigmentation and oxidative reactions that the action of the management in which the animal is subjected and the effect of the environment exert on fur and skin, hoof, mane and tail (MENDES et al., 2018). Thus, this study is justified by the interest of society in general and the scientific community, by the demand for knowledge on the subject and by representing a larger phase of the project that has been developed with students from the federal network of institutes.

MATERIAL AND METHODS

QUARTER HORSE

The study was carried out, through remote work, between August 1, 2020 and July 31, 2021, through retrospective research, through free access to research websites and breed associations, aiming to record the phenotypic expression of the coat and particularities of the coats, in 1,029 randomly selected individuals of the breed, of both sexes, lineages, their respective fathers, grandfathers and grandmothers, paternal and

maternal. The frequency of phenotypic expression of the coat and its particularities in Quarter Horses was calculated. The means of the coats and particularities will be compared using the Scheffe test, all at the 5% level of significance.

RESULTS AND DISCUSSION

During the period of execution of the project, due to the difficulties of internet and equipment, it is noteworthy that the number of animals obtained was lower than expected due to the difficulty of access to the internet during the experimental period and due to the absence of animals from parents with certain coats, totaling 851 animals analyzed. Among the combinations of animals researched, those that presented a significant number of products were those from matings between parents of the following coats: Sorrel with Sorrel; Chestnut sorrel; Sorrel with Tordilha; Sorrel with Bay; Baia with Tordilha; Bay with Zaina; Chestnut with Chestnut; Chestnut with Tordilla; Chestnut with Zaina; Rosilha with Tordilha; and Rosilha with Zaina. These results highlight two important aspects related to the horses of this breed. The first refers to the technical and commercial interests in Quarter Horses of Baia, Rosilha and Zaina coats, due to the market demand for animals that associate desired performance and morphology. The other aspect is related to the genetic regulation of coats in horses of different breeds, whose genetic interaction leads to greater phenotypic expression of the sorrel, chestnut, tordilla and zaina coats. Such evidence elucidates the genetic composition of the coat only through genetic tests or through studies such as this one, which randomly evaluate the progeny of different breeders as a progeny test (BAILEY; BROOKS, 2020; HOLL et al., 2019), as well as was observed in Quarter Horses present in Brazil. By associating the two aspects, we have the coats of lesser phenotypic expression, but of great commercial interest and aiming to obtain greater profitability with animals of rare coats, among them, the mating between: Baia with Cremelo; Bay with Bay; Bay with Zaina; Chestnut with Cremelo; Cremelo with Zaina; and Zaina with Zaina.

In this sense, the importance and increasing use of breeding stock genotyping to control coat genes (PEREIRA, 2001; REZENDE, 2001), as well as its presence in homozygosis or heterozygosis, associated with the relationship between the presence of the coat regulatory gene and congenital-hereditary diseases, simultaneously (CORBIN et al., 2020; MARCHIORI, 2018; SEGARD et al., 2013).

Regarding the particularities, the websites and the association did not allow the analysis of the particularities present in the animals, since the reviews are not complete for all the animals. This fact made it impossible to determine the particularities in the animals

studied. Among the animals studied, there was no statistical difference ($p < 0.05$) in relation to the type of coat when comparing male and female animals. In the same way, when comparing the different degrees of blood: own brothers, paternal brothers, maternal brothers and non-brothers. Such observations confirm what had already been previously reported for animals of other breeds, when comparing animals of different sexes and the gene transmission of the coat in the different degrees of blood and types of matings (BAILEY; BROOKS, 2020; HOLL et al., 2019).

MANGA MARCHADOR

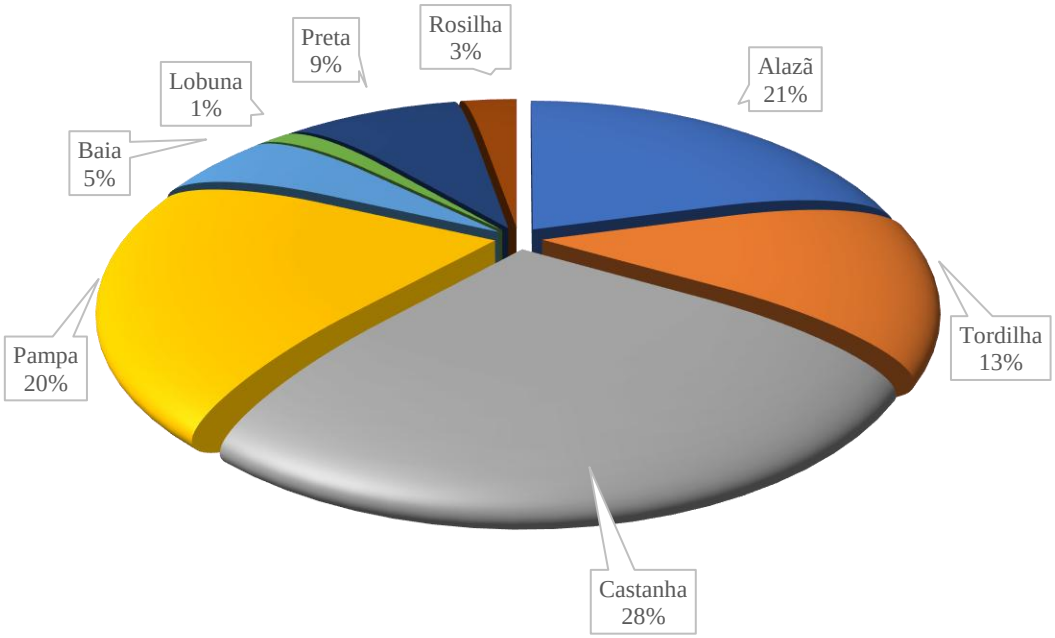
The study was carried out, through remote work, between August 1, 2020 and July 31, 2021, through research and access to information from 982 randomly selected individuals, of both sexes and lineages, registered with the Association of Breeders of the Mamgalarga Marchador Horse. The classification of the animals' coats will consider the definitive registration regulation of the Quarter Horse, being considered: Sorrel, Baia, Chestnut, Lobuna, Pampa, Black, Rosilha and Tordilha. Then, the mean was calculated to discriminate the frequency of phenotypic expression of the animals' coat.

RESULTS AND DISCUSSION

MANGA MARCHADOR

During the period of execution of the project, the phenotypic frequency of coats of the horses of the Mangalarga Marchador breed determined showed that 19.82% (204/1029) of the animals surveyed have sorrel coat, 5.15% (53/1029) of Baia coat, 27.11% (279/1024) of Brown coat, 1.36% (14/1029) of Lobuna coat, 19.24% (198/1029) of Pampa coat, 8.16% (84/1029) of Black coat, 2.62% (27/1029) of Rosilha coat and 11.95% (123/1029) of Tordilha coat, As shown in the following graphic:

Figure 1. Percentage of coat expression of Mangalarga Marchador horses evaluated between August 2020 and July 2021.



Proportionally, the phenotypic expression of the coats was equally distributed between male and female animals, being equivalent to 49.7% and 50.3%, respectively. The average frequency of coats in the breed confirmed the genetic regulation described for animals of several breeds present in the world previously reported, related to the genetic regulation of the coat in horses (REZENDE; COSTA, 2019). The same result corroborated that the gene interaction that regulates the phenotypic expression of the coat is not a trait influenced by sex.

FINAL CONSIDERATIONS

Under experimental conditions, it is considered that the Quarter Horse breed has a casuistry of the occurrence of coats similar to the other known equine breeds, regardless of the sex of the animal.

Under experimental conditions, it is considered that the Mangalarga Marchador breed has a casuistry of the occurrence of coats similar to other known equine breeds, regardless of the sex of the animal.

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